UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,574	12/13/2001	G. William Walster	SUN-P6446-SPL	8138

			EXAMINER
22835	7590	12/30/2004	DO, CHAT C

PARK, VAUGHAN & FLEMING LLP
508 SECOND STREET
SUITE 201
DAVIS, CA 95616

ART UNIT	PAPER NUMBER
2124	

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>22 September 2004 and 12 October 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-30</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-8, 10-18, 20-28,30</u> is/are rejected.

7)☒ Claim(s) <u>9,19 and 29</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>12/13/01</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date <u>09/22/04; 10/12/04</u>.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This communication is responsive to Amendment filed 09/22/2004.

2.   Claims 1-30 are pending in this application. Claims 1, 11, and 21 are independent

claims. In Amendment, claims 1-2, 5-12, 15-22, and 25-30 are amended. This action is made

non-final.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on
sale in this country, more than one year prior to the date of application for patent in the United States.

4.   Claims 1-8, 10-18, 20-28, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated

by Eldon ("Global Optimization using Interval Analysis").

Re claim 1, Eldon discloses in section "Inequality –Constrained Optimization"

pages 167-178 a method for using a computer system to solve a global inequality

constrained optimization problem (Preface section and page VI lines 15-20 and 25-30)

specified by a function f (page 167 line 10) and a set of inequality constraints $p_i(x) <= 0$

(i=1, ...,m) (page 167 line 11), wherein/and pi are scalar functions of a vector x = (x1, x2,

x3, ... xn) (page 168 lines 12-15), the method comprising: receiving a representation of

the function f and the set of inequality constraints at the computer system (page 167 lines

10-11), storing the representation in a memory within the computer system (inherently

under preface section and page VI lines 15-20 and 25-30); performing (pages 174-175

under the steps of the algorithm) an interval inequality constrained global optimization

process to compute guaranteed bounds on a globally minimum value of the function f(x)

subject to the set of inequality constraints; wherein performing the interval global

optimization process involves, applying term consistency to the set of inequality

constraints over a sub-box X (e.g. step 6 under the steps of the algorithm), and excluding

(e.g. step 4 under the steps of the algorithm) any portion of the sub-box X that is proved

to be in violation of at least one member of the set of inequality constraints; and

recording the guaranteed bounds (page 1 of Preface section lines 10-15) in the computer

system memory.

Re claim 2, Eldon further discloses in section "Inequality –Constrained

Optimization" pages 167-178 linearizing the set of inequality constraints to produce a set

of linear inequality constraints with interval coefficients that enclose the nonlinear

constraints (pages 172-173 under the linearizing the constraints); preconditioning the set

of linear inequality constraints through additive linear combinations to produce a

preconditioned set of linear inequality constraints; applying term consistency to the set of

preconditioned linear inequality constraints over the sub-box X, and excluding any

portion of the sub-box X that violates any member of the set of preconditioned linear

inequality constraints (e.g. step 17 under the steps of the algorithm).

Re claim 3, Eldon further discloses in section "Inequality –Constrained

Optimization" pages 167-178 keeping track of a least upper bound f_bar of the function

f(x) at a feasible point x wherein pi(x) <= 0 (i=1, ...,,m;); and including f(x) < f-bar in the

set of inequality constraints prior to linearizing the set of inequality constraints (e.g. steps

1 and 2 under the steps of the algorithm).

Re claim 4, Eldon further discloses in section "Inequality –Constrained

Optimization" pages 167-178 removing from consideration any inequality constraints

that are not violated by more than a specified amount for purposes of applying term

consistency prior to linearizing the set of inequality constraints (steps 1 and 2 under the

steps of the algorithm).

Re claim 5, Eldon further discloses in section "Inequality –Constrained

Optimization" pages 167-178 performing the interval global optimization process

involves: keeping track of a least upper bound f-bar of the function f(x) at a feasible point

x; removing from consideration any - sub-box for which f(x) >=f-bar, applying term

consistency to the f-bar inequality f(x) < f-bar over the sub-box X; and excluding any

portion of the sub-box X that violates the f-bar inequality (e.g. steps 1-6 under the steps

of the algorithm).

Re claim 6, Eldon further discloses in section "Inequality –Constrained

Optimization" pages 167-178 if the sub- box X is strictly feasible pi(X) < 0 for all i=1,

...,n), performing the interval global optimization process involves: determining a

gradient g(x) of the function f(x), wherein g(x) includes components g(x) (i=1, ...,n);

removing from consideration any sub-box for which g(x) is bounded away from zero,

thereby indicating that the, sub-box does not include an extremum of f(x); and applying

term consistency to each component p(x)=0 (i= 1, ...,n) of g(x)=0 over the sub-box X;

and excluding any portion of the sub-box X that violates any component of g(x)=0 (e.g.
steps 1-6 in page 171).

Re claim 7, Eldon further discloses in section "Inequality –Constrained
Optimization" pages 167-178 if the sub- box X is strictly feasible (pi(X) < 0 for all i=l,
...,n), performing the interval global optimization process involves: determining diagonal
elements Hii(x) (i=1, ...,n) of the Hessian of the function f(x); removing from
consideration any sub-box for which Hii(x) a diagonal element of the Hessian over the -
sub-box X is always negative, indicating that the function is not convex over the 'sub-box
X and consequently does not contain a global minimum within the 'sub-box X; applying
term consistency to each inequality Hii(x) k 0 (i=1, ...,a) over the sub-box X; and
excluding any portion of the sub-box X that violates a Hessian inequality (e.g. page 172
lines 10-20 under certainly strict feasibility section).

Re claim 8, Eldon further discloses in section "Inequality –Constrained
Optimization" pages 157-159 if the sub- box X is strictly feasible (pi(X) < 0 for all i=l,
...,n), performing the interval global optimization process involves: performing the
Newton method, wherein performing the Newton method involves, computing the
Jacobian J(x,X) of the gradient of the function/evaluated with respect to a point x over the
sub- box X, computing an approximate inverse B of the center of J(x,X), using the
approximate inverse B to analytically determine the system Bg(x), wherein gtx) is the
gradient of the function f(x), and wherein g(x) includes components gjtx) (f=1, ...,n);
applying term consistency to each component (Bg(x))i = 0 (i=l, ...,n) for each variable xi
(i=l, ...,n) over the sub-box X; and excluding any portion of the 'sub-box X that violates a

component (e.g. Solving the John conditions section particularly page 158 lines equation 10.5.3 and lines 1-15 from bottom).

Re claim 10, Eldon further discloses in section "Inequality –Constrained Optimization" pages 158-178 performing the Newton method on the John conditions (e.g. Solving the John conditions section particularly page 158 lines equation 10.5.3 and lines 1-15 from bottom).

Re claim 11, it is a computer-readable storage medium claim of claim 1. Thus, claim 11 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 12, it is a computer-readable storage medium claim of claim 2. Thus, claim 12 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 13, it is a computer-readable storage medium claim of claim 3. Thus, claim 13 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 14, it is a computer-readable storage medium claim of claim 4. Thus, claim 14 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 15, it is a computer-readable storage medium claim of claim 5. Thus, claim 15 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 16, it is a computer-readable storage medium claim of claim 6. Thus, claim 16 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 17, it is a computer-readable storage medium claim of claim 7. Thus, claim 17 is also rejected under the same rationale as cited in the rejection of rejected claim 7.

Re claim 18, it is a computer-readable storage medium claim of claim 8. Thus, claim 18 is also rejected under the same rationale as cited in the rejection of rejected claim 8.

Re claim 20, it is a computer-readable storage medium claim of claim 10. Thus, claim 20 is also rejected under the same rationale as cited in the rejection of rejected claim 10.

Re claim 21, it is an apparatus claim of claim 1. Thus, claim 21 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 22, it is an apparatus claim of claim 2. Thus, claim 22 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 23, it is an apparatus claim of claim 3. Thus, claim 23 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 24, it is an apparatus claim of claim 4. Thus, claim 24 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 25, it is an apparatus claim of claim 5. Thus, claim 25 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 26, it is an apparatus claim of claim 6. Thus, claim 26 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 27, it is an apparatus claim of claim 7. Thus, claim 27 is also rejected under the same rationale as cited in the rejection of rejected claim 7.

Re claim 28, it is an apparatus claim of claim 8. Thus, claim 28 is also rejected under the same rationale as cited in the rejection of rejected claim 8.

Re claim 30, it is an apparatus claim of claim 10. Thus, claim 30 is also rejected under the same rationale as cited in the rejection of rejected claim 10.

Allowable Subject Matter

5.   Claims 9, 19, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.
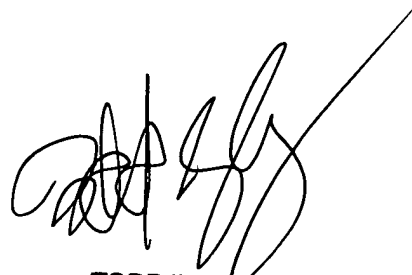
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (571) 272-3719. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2124

December 20, 2004

TODD INGBERG
PRIMARY EXAMINER